

REMARKS

Claims 1-8 and 13-81 are pending in this application. Claims 21-23, 26-29, 32 and 65 are amended to clarify embodiments of the present invention. Claims 74-81 are added.

Favorable reconsideration and allowance of the present patent application are respectfully requested. These amendments, in conjunction with the following remarks, are believed to place the application in immediate condition for allowance. Accordingly, the entry of these amendments and favorable consideration of the application are respectfully requested.

Allowable Subject Matter

Applicants note with appreciation that the Examiner indicates that claim 33 is allowed. Applicants also note with appreciation that the Examiner indicates that claims 60-63 contain allowable subject matter, and would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claims.

Election/Restrictions

The Examiner imposed a restriction requirement in a previous Action. Applicants requested in a previous Reply that claims 21-23, 26-29, and 32 be entitled examination. In the Office Action, the Examiner, however, states that "[i]f

Applicant used the term 'diode', it would have been generic to LEDs SDs and laser diodes." Accordingly, Applicants amend claims 21-23, 26-29 and 32 by reciting diode in the claims. Therefore, Applicants maintain that claims 21-23, 26, 29, and 32 should be entitled examination.

35 U.S.C. § 112, second paragraph

Claims 34-35 and 56-69 are rejected as allegedly being indefinite. The Office Action queries the meaning of the term "in time sharing," because the term seems to have no known meaning as used. In response to the Office Action's query, Applicants note that the term "in time sharing" appears in the specification on page 49, lines 21-24. In the context of the specification, the term is used to indicate that beams of different wavelength are output in turn and in time-division fashion, e.g., for example, page 33, line 17. Thus, Applicants maintain that the proper meaning for "in time sharing" may be construed according to the application.

The Office Action also queries also the meaning of the term "parallel conversion." The Office Action assumes it means "collimation" and has examined the claims accordingly. In response to the Office Action's query, Applicants respectfully submit that the term indeed means collimation. Figure 1, numeral 60.

The Office Action alleges that the language "similar to the light utilizing shape" is indefinite. Applicants amend claim 65 to clarify embodiments of the present invention. Therefore, Applicants respectfully request that the indefiniteness rejections be withdrawn.

35 U.S.C. § 102(b)

Claims 34-35 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by U.S. Patent No. 5,451,745 (Ferguson). Claims 59 and 66-69 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent No. 5,926,318 (Herbert). Claims 65-69 and 70-73 stand rejected under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent No. 5,808,800 (Handschy et al.). Applicants respectfully traverse the rejections in view of the foregoing amendments and the following remarks.

Claims 34-39 Are Not Anticipated

Claims 34-35 are rejected as allegedly anticipated by Ferguson. Applicants respectfully disagree. According to the Office Action, Ferguson describes a field sequential device with an array of LEDs.

Ferguson relates to a full color frame sequential illumination system and display. Ferguson's illumination subsystem uses light sources 30r, 30g, and 30b, each having a

different wavelength. Figure 9. Illumination sub-system 320 is intended to illuminate sequentially the display 23 with respective wavelengths of light.

Applicants maintain that Ferguson does not disclose a luminous device of "arrayed" light sources. Ferguson merely describes the multiple light sources 30r, 30g and 30b, however, such light sources are not in an "arrayed" formation. Therefore, Applicants maintain that Ferguson does not disclose each and every element of claims 34-35. Applicants respectfully request that the Examiner withdraw the anticipation rejections to claims 34-35.

Claims 59 and 66-69 Are Not Anticipated

Claims 59 and 66-69 are rejected as allegedly being anticipated by Herbert. According to the Office Action, Herbert discloses an HMD employing an array of plural LEDs, collimation and projection optics, in micro mirror devices. Applicants respectfully disagree.

Herbert relates to a biocular viewing system for viewing video images generated by single electro-optic device. Each of the two optical channels in Herbert contains its own illumination source, eyepiece lens, and imaging optics.

Applicants maintain that Herbert's light source does not disclose the "luminous device" of the claimed embodiments. The

single or multiple LEDs of Herbert do not disclose the "arrayed plural" EL or LED elements, as recited in claims 59 and 66-69. Column 5, lines 1-2. Further, Herbert does not disclose the use of EL elements as a light source. Therefore, each and every element of the claimed embodiments are not disclosed by Herbert.

Further, claim 59 recites that the optical switch is a digital micromirror device (DMD). The Office Action alleges that Herbert discloses a micromirror device. Applicants, however, maintain that this feature is not found anywhere in Herbert. Herbert describes a transmissive microdisplay, a transmissive display device 110, a reflective microdisplay, and a reflective display device 310. These structures, however, do not disclose a DMD.

In general, a microdisplay is defined as a timing optical switching device that is used for a projection display. A transmissive liquid crystal panel projector is a transmissive microdisplay. A reflective liquid crystal panel, such as liquid crystal on silicon, is a reflective microdisplay. A DMD is a reflective microdisplay. Therefore, Herbert does not disclose a micromirror device. Further, any discussion about "digital" or digitalization, which is a significant factor for DMD, is not found in Herbert. Referring to Figure 3A-3D of Herbert that illustrates a reflective display device, there is no disclosure

or suggestion about an OFF LIGHT, or non-use light, for use with a DMD. Thus, Herbert does not disclose or suggest the feature of a DMD. For at least these reasons, Applicants respectfully request that the Examiner withdraw the anticipation rejections to claims 59 and 66-69.

Claims 66-69 and 70-73 Are Not Anticipated

Claims 66-69 and 70-73 are rejected as allegedly being anticipated by Handschy. According to the Office Action, Handschy discloses a projector with collimation and projection optics including a 2-dimensional array of LEDs. Applicants respectfully disagree.

Handschy describes a system for producing modulated light. Referring to Figure 6 of Handschy, light sources 52 are positioned closer to collimating lenses 60 that causes the lenses to direct the light into special light modulator 46 in a slightly divergent manner. The light source is shown in Figure 7, where an array of light sources 68, such as LED die, are attached to a glass substrate. Column 12, lines 7-13.

Handschy describes an arrayed light sources and different colors that is characterized by:

- 1) Arrayed light sources, such as LED elements in the arrangement of three rows and three columns, as shown in Figure 7A,

- 2) Each of the light sources may be made up of a cluster of light sources, as described in column 12, line 36, and
- 3) Each cluster of light sources includes light sources of different colors such as red, green and blue for color display, as described in column 12, line 37.

Applicants maintain that the claimed embodiments define that the arrayed light source includes a plurality of luminous devices in color, each composed of a plurality of light source elements of the same color and nearly the same wavelength. As recited in claim 70, "the luminous device is composed of a plurality of luminous devices, each of the luminous devices being composed of a plurality of arrayed light sources outputting lights of nearly the same wavelength."

As recited in claim 72, "the luminous device is composed of a plurality of luminous devices; each of the luminous devices being composed of a plurality of arrayed electro-luminescent elements or arrayed light emitting diode elements outputting lights of nearly the same wavelength." Thus, Handschy does not disclose these features of claims 70 and 72.

The claimed embodiments also disclose that the arrayed groups each are made of light source elements of multiple colors and different wavelengths within the groups or between groups. Claim 71 recites "the luminous device is composed of arrayed

luminous device groups, each of which is made of light sources of plural kinds outputting lights of different wavelengths."

Claim 73 recites "the luminous device is composed of arrayed electro-luminescent groups or arrayed light emitting diode groups, each of the groups being made of electro-luminescent elements or light emitting diode of plural kinds outputting lights of different wavelengths."

Thus, the claimed embodiments disclose two types of arrayed light sources characterized in wavelength, which are distinguishable from the array of Handschy. This distinction is based on the fact that it is desirable to use a light source composed of a plurality of light source elements in order to control speckle pattern. The light source composed of a plurality of light source elements is preferable for avoiding the occurrence of interference, so that the speckle pattern as a possible cause of serious effect on image display quality can be controlled.

Specifically, using a light source composed of a plurality of light source elements is desirable with an arrayed light source composed of light source elements of the same wavelength. Further, it is effective to use a plurality of light source elements of nearly the same wavelength in order to control speckle pattern with the arrayed light source composed of light

source elements of the same color. Such an effect increases as the light source gets nearer to a point source. Thus, Applicants maintain that Handschy fails to disclose or suggest the feature of the arrayed light source composed of light source elements, such as LED and EL, characterized with the two factors of "color" and "wavelength."

Applicants also maintain that Handschy does not disclose EL as a light source. Handschy describes LD, FED, incandescent lamp, fluorescent lamp and switchable color filter as well as LED as light sources. Column 12, line 31. Handschy does not describe using EL as a light source. Applicants maintain that the spatial light modulator of Handschy is unnecessary for an EL display device that forms a minute pixel through high-speed response and auto emission.

With a LED die, on the other hand, Applicants maintain that Handschy describes a LED display unit using a spatial light modulator because the LED die is too large to use as a pixel with modulation function, and, therefore, not available for enhancing resolution for display. This same relationship is applied to other light sources such as LD, FED, incandescent lamp, fluorescent lamp and switchable color filter. Consequently, Applicants maintain that EL is distinguishable from other light sources such as LED or LD. Thus, Handschy does

not disclose arrayed EL elements, as recited in the claim embodiments. Applicants respectfully request that the Examiner withdrawal the anticipation rejections of claims 65-69 and 70-73.

35 U.S.C. § 103(a)

Claims 34, 65-69 and 70-73 are rejected as allegedly rendered obvious by Handschy in view of Fergason. The Office Action also alleges that claim 33 is rendered obvious, but claim 33 also is allowed. Applicants must assume that the listing of claim 33 is a typographical error. The Office Action concedes that Handschy lacks the field sequential operation. The Office Action alleges that this feature is taught by Fergason as enabling higher resolution. Applicants respectfully disagree.

To establish obviousness, the Office Action must meet three basic criteria. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art references must teach or suggest all the claim limitations. MPEP 2143. Applicants respectfully maintain that the Office Action fails to establish obviousness with respect to claims 34, 65-69 and 70-73.

As noted above, the cited patents must disclose or suggest all the claimed embodiments. As Applicants noted above with respect to Handschy and Fergason, Handschy and Fergason do not disclose all the features of the claim embodiments.

Specifically, Fergason does not disclose the use of "arrayed" light sources. Further, Handschy does not disclose the feature of a "luminous device." Further, neither Fergason nor Handschy suggest these features missing from the claimed embodiments. Moreover, Applicants maintain that Office Action provides no evidence of a motivation to combine Fergason or Handschy to achieve Applicants' invention. Therefore, Applicants respectfully request the Examiner to withdraw the obviousness rejections to claims 34, 65-69 and 70-73.

Conclusion

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact William F. Nixon (Reg. No. 44,202) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any

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overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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